

Network Working Group  
Internet-Draft  
Obsoletes: 3814 (if approved)  
Expires: January 7, 2010

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July 6, 2009

draft-kumar-mpls-fec-to-nhlfe-mib-00

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#### Abstract

This memo defines a portion of the Management Information Base for use with network management protocols in the Internet community. In particular, it describes managed objects for FEC-to-NHLFE for use in Multiprotocol Label Switching (MPLS) network.

The MIB module defined in this document is used for configuring, and monitoring Forwarding Equivalence Class (FEC) to Next Hop Label Forwarding Entry (NHLFE) mappings and corresponding actions for use with Multiprotocol Label Switching (MPLS).

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## 1. Introduction

This document defines a portion of the Management Information Base (MIB) for use in managing objects related to the Forwarding Equivalence Class (FEC) to Next Hop Label Forwarding Entry (NHLFE) mappings and corresponding actions for Multiprotocol Label Switching (MPLS). Using this document, user can configure LSRs to redirect non-MPLS traffic into an MPLS cloud.

At the ingress of a MPLS cloud, depending on the matching parameters a packets entering the MPLS domain are assigned to an FEC. The "FEC to NHLFE" (FTN) maps each FEC to a set of NHLFE's. It is used for forwarding packets that arrive unlabeled i.e packets received from outside the MPLS domain at the ingress, but which are to be labeled before being forwarded.

This document implements the FTN table functionality using the Forwarding Information Base (FIB) to map all packets destined for a prefix to an LSP. Along with the packet destination, this MIB module also extends the matching criteria to certain other parameters. This document use a simple indexing structure, making it easier to implement.

## 2. The Internet-Standard Management Framework

For a detailed overview of the documents that describe the current Internet-Standard Management Framework, please refer to section 7 of RFC 3410 [RFC3410].

Managed objects are accessed via a virtual information store, termed the Management Information Base or MIB. MIB objects are generally accessed through the Simple Network Management Protocol (SNMP). Objects in the MIB are defined using the mechanisms defined in the Structure of Management Information (SMI). This memo specifies a MIB module that is compliant to the SMIv2, which is described in STD 58, RFC 2578 [RFC2578], STD 58, RFC 2579 [RFC2579] and STD 58, RFC 2580 [RFC2580].

## 3. Terminology

Although all of the terminology used in this document is either covered in the MPLS Architecture [RFC3031] or in the SNMP Architecture [RFC3411], it is informational to define some immediately pertinent acronyms/terminology here.

MPLS Multiprotocol Label Switching  
FEC Forwarding Equivalence Class  
NHLFE Next-Hop Label Forwarding Entry  
FTN FEC-to-NHLFE  
MIB Management Information Base

#### 4. Conventions

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119 [RFC2119].

#### 5. Improvements over MPLS-FTN-STD-MIB (RFC3814)

##### 5.1. Difficulty in associating incoming packet with FTN Rules.

In RFC3814, mplsFTNMapTable table provides the capability to activate or map FTN entries defined in mplsFTNTable to specific interfaces in the system. Packets received on an interface are compared against FTN entries in the order in which entries are applied to the interface.

To find the FTN rules applied on an incoming packet at interface (ifIndex) which is destined for address "a.b.c.d" with source address "w.x.y.z" with a specified source and destination port, the network management station will need the following actions: - The network management station will first need to perform SNMPWALK (repeated GETNEXT) operation on mplsFTNMapRowStatus.ifIndex.0.0; the returned i object, if one exists is (say) mplsFTNMapRowStatus.ifIndex.n.m. - Then for all 'm's retrieved from the above step, the network management station shall perform GET on mplsFTNTable objects. - The network management station then need some intelligence to compare the packet parameters (src/dest address, src/dest port etc) with the mplsFTNTable objects. e.g. mplsFTNSourceAddrMin, mplsFTNSourceAddrMax, mplsFTNDestAddrMin, mplsFTNDestAddrMax, mplsFTNSourcePortMin etc.

Because of the above listed efforts, a network administrator using RFC3814 will need some extra effort in extracting some meaningful data. Also, the i complex indexing structure makes it difficult to implement.

This document simplifies the indexing structure by using a structure similar to the forwarding table [RFC4292].

## 5.2. Removal of mplsFTNPerfTable

The table mplsFTNPerfTable that maintains per route performance statistics is of questionable usefulness. It is highly unlikely that anybody maintains such statistics. This document doesn't list any table for statistics.

## 6. Outline

This MIB module shall be supported on any LSR that does the FEC-to-NHLFE mapping in order to map traffic into the MPLS domain. This MIB module consists of following tables:

### 6.1. mplsFTNRuleTable

Each entry in this table (also referred to as an "FTN entry" in this document) defines a rule to be applied to packets which are to be forwarded to a destination.

To map the FEC-to-NHLFE, this table use the destination address and a pointer to mplsFTNRulePolicyTable as the index.

mplsFTNRulePolicyTable further extends the packet matching conditions to source address range, source port range, destination port range, IPv4 Protocol field [RFC791] or IPv6 next-header field [RFC2460], and the DiffServ Code Point (DSCP, [RFC2474]).

This table also defines Packet redirection action to be performed on successful mapping. This is based on an action pointer (mplsFTNRuleActionPointer) which points either at an mplsXCEntry in MPLS-LSR-STD-MIB [RFC3813] when the NHLFE is a non-TE LSP, or at an mplsTunnelEntry in MPLS-TE-STD-MIB [RFC3812] when the NHLFE is the origin of a TE tunnel.

mplsFTNRuleTable use an index structure similar to the forwarding table [RFC4292] making it easier to implement.

### 6.2. mplsFTNRuleTable

The mplsFTNRulePolicyTable provides extended optional rules to be applied on an entry in mplsFTNRuleTable.

## 7. Example Illustrating MIB Module Components

In this section, we use an example to illustrate how the objects defined in MPLS-FTN-RULE-MIB work together to perform FEC to NHLFE mapping. Note that for the various table entries involved in this example, we only show the objects that help illustrate this example.

### 7.1. Creating FTN Entries

Suppose that we wish to create entries in `mplsFTNRuleTable` and `mplsFTNRulePolicyTable` which match the following conditions:

- Packet is destined to IPv4 address matching 192.0.2.50
- Source IPv4 address matching 192.0.2.63
- An LSP with and outgoing label = 150 where the specified LSP is represented by the following entries in `mplsXCTable` and `mplsOutSegmentTable`.

In mplsXCTable:

```
{
  mplsXCIndex = 0x02,
  mplsXCInSegmentIndex = 0x00,
  mplsXCOutSegmentIndex = 0x03,
  mplsXCLabelStackIndex = 0
}
-- The value 0x00 for mplsXCInSegmentIndex represents an originating
-- LSP [RFC3813].
```

In mplsOutSegmentTable:

```
{
  mplsOutSegmentIndex = 0x03,
  mplsOutSegmentIfIndex = 50,
  mplsOutSegmentPushTopLabel = true,
  mplsOutSegmentTopLabel = 150
}
```

The above condition can be implemented by the following entry in mplsFTNRuleTable and mplsFTNRulePolicyTable:

mplsFTNRuleTable:

```
{
  mplsFTNRuleAddrType = ipv4,
  mplsFTNRuleDestAddr = 192.0.2.50,
  mplsFTNRuleDestPfxLen = 32,
  -- index of entry in mplsFTNRulePolicyTable
  mplsFTNRulePolicyPointer = 1,
  mplsFTNRuleActionType = redirectTunnel(2),
  mplsFTNRuleActionPointer = mplsXCLspId.1.2.1.0.1.3
}
```

mplsFTNRulePolicyTable:

```
{
  mplsFTNRulePolicyIndex = 1,
  mplsFTNRulePolicyMask = 0x80,
  mplsFTNRulePolicySrcAddr = 192.0.2.63,
  mplsFTNRulePolicySrcPfxLen = 32,
  mplsFTNRulePolicySrcPortMin = 0,
  mplsFTNRulePolicySrcPortMax = 0,
  mplsFTNRulePolicyDestPortMin = 0,
  mplsFTNRulePolicyDestPortMax = 0,
  mplsFTNRulePolicyProtocol = 0,
  mplsFTNRulePolicyDscp = 0
}
```

## 8. MPLS-FTN-RULE-MIB Definitions

```

MPLS-FTN-RULE-MIB DEFINITIONS ::= BEGIN

IMPORTS MODULE-IDENTITY, OBJECT-TYPE, Unsigned32, Counter64, Integer32
    FROM SNMPv2-SMI -- [RFC2578]
RowStatus, StorageType, RowPointer, TEXTUAL-CONVENTION, TimeStamp
    FROM SNMPv2-TC -- [RFC2579]
MODULE-COMPLIANCE, OBJECT-GROUP
    FROM SNMPv2-CONF -- [RFC2580]
InterfaceIndexOrZero, ifGeneralInformationGroup, ifCounterDiscontinuityGroup
    FROM IF-MIB -- [RFC2863]
SnmAdminString
    FROM SNMP-FRAMEWORK-MIB -- [RFC3411]
Dscp
    FROM DIFFSERV-DSCP-TC -- [RFC3289]
InetAddressType, InetAddress, InetPortNumber, InetAddressPrefixLength
    FROM INET-ADDRESS-MIB -- [RFC3291]
mplsStdMIB
    FROM MPLS-TC-STD-MIB -- [RFC3811]
;

mplsFTNRuleMIB MODULE-IDENTITY
    LAST-UPDATED "200907060000Z" -- July 06, 2009
    ORGANIZATION
        "Multiprotocol Label Switching (MPLS) Working Group"
    CONTACT-INFO
        "
            Subodh Kumar
            Juniper Networks
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            Ron Bonica
            Juniper Networks
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            Comments about this document should be emailed
            directly to the MPLS working group mailing list at
            mpls@lists.ietf.org"

    DESCRIPTION "This draft contains managed object definitions for
        specifying FEC to NHLFE (FTN) mappings."

    -- Revision history.

    REVISION
        "200907060000Z" -- July 06, 2009

```

## DESCRIPTION

"Initial version of the draft."

::= { mplsStdMIB XX } -- XX to be assigned by IANA

-- TEXTUAL-CONVENTIONS used in this MIB.

MplsFTNRuleIndex ::= TEXTUAL-CONVENTION

STATUS current

## DESCRIPTION

"Index for an entry in mplsFTNTable."

SYNTAX Unsigned32 (1..4294967295)

MplsFTNRuleEntryIndexOrZero ::= TEXTUAL-CONVENTION

STATUS current

## DESCRIPTION

"Index for an entry in mplsFTNRulePolicyTable or the special value zero. The value zero is object-specific and must therefore be defined as part of the description of any object which uses this syntax. Examples of the usage of zero might include situations when none or all entries in mplsFTNRulePolicyTable need to be referenced."

SYNTAX Unsigned32 (0..4294967295)

-- Top-Level Components of this MIB.

mplsFTNRuleObjects OBJECT IDENTIFIER ::= { mplsFTNRuleMIB 1 }

mplsFTNRuleConformance OBJECT IDENTIFIER ::= { mplsFTNRuleMIB 2 }

-- Table of FTN entries.

mplsFTNRuleTable OBJECT-TYPE

SYNTAX SEQUENCE OF MplsFTNRuleEntry

MAX-ACCESS not-accessible

STATUS current

## DESCRIPTION

"This table contains the entries that defines FEC to NHLFE mappings. Each entry in this table defines a rule to be applied to incoming packets and an action to be taken on matching packets (mplsFTNRuleActionPointer)."

This table supports matching rules based on source address range, destination address range and entry in mplsFTNRulePolicyTable.

The action pointer points either to instance of mplsXCEntry in MPLS-LSR-STD-MIB when the NHLFE is a non-TE LSP, or to an instance of mplsTunnelEntry in the MPLS-TE-STD-MIB when the NHLFE is an originating TE tunnel."

```
::= { mplsFTNRuleObjects 1 }
```

```
mplsFTNRuleEntry OBJECT-TYPE
    SYNTAX      MplsFTNRuleEntry
    MAX-ACCESS   not-accessible
    STATUS      current
    DESCRIPTION
        "Each entry defines a FTN Rule to compare incoming
        packets with and an action to be taken on matching
        packets."
    INDEX { mplsFTNRuleAddrType,
            mplsFTNRuleDestAddr,
            mplsFTNRuleDestPfxLen,
            mplsFTNRulePolicyPointer
          }
```

```
::= { mplsFTNRuleTable 1 }
```

```
MplsFTNRuleEntry ::= SEQUENCE {
    mplsFTNRuleAddrType      InetAddressType,
    mplsFTNRuleDestAddr      InetAddress,
    mplsFTNRuleDestPfxLen    InetAddressPrefixLength,
    mplsFTNRulePolicyPointer  MplsFTNRuleIndex,
    mplsFTNRuleActionType    INTEGER,
    mplsFTNRuleActionPointer  RowPointer,
    mplsFTNRuleStorageType    StorageType,
    mplsFTNRuleRowStatus     RowStatus
}
```

```
mplsFTNRuleAddrType OBJECT-TYPE
    SYNTAX      InetAddressType
    MAX-ACCESS   not-accessible
    STATUS      current
    DESCRIPTION
        "The type of the mplsFTNRuleDestAddr and
        mplsFTNRulePolicySrcAddr address, as defined in the
        InetAddress MIB."
    ::= { mplsFTNRuleEntry 1 }
```

```
mplsFTNRuleDestAddr OBJECT-TYPE
    SYNTAX      InetAddress
    MAX-ACCESS   not-accessible
    STATUS      current
```

## DESCRIPTION

"The Destination IP address. The type of this object is determined by the corresponding mplsFTNRuleAddrType object."

::= { mplsFTNRuleEntry 2 }

mplsFTNRuleDestPfxLen OBJECT-TYPE

SYNTAX InetAddressPrefixLength

MAX-ACCESS not-accessible

STATUS current

## DESCRIPTION

"Indicates the number of leading one bits that form the mask to be logical-ANDed with the destination address before being compared to the value in the mplsFTNRuleDestAddr field.

The values for the index objects mplsFTNRuleDestAddr and mplsFTNRuleDestPfxLen must be consistent. When the value of mplsFTNRuleDestAddr (excluding the zone index, if one is present) is x, then the bitwise logical-AND of x with the value of the mask formed from the corresponding index object mplsFTNRuleDestPfxLen MUST be equal to x. If not, then the index pair is not consistent and an inconsistentName error must be returned on SET or CREATE requests."

::= { mplsFTNRuleEntry 3 }

mplsFTNRulePolicyPointer OBJECT-TYPE

SYNTAX MplsFTNRuleIndex

MAX-ACCESS not-accessible

STATUS current

## DESCRIPTION

"The index of the mplsFTNRulePolicyTable. Its purpose is to serve as an additional index that may delineate between multiple entries to source and destination. The value '0' shall be used as the default value for this object. A value '0' signifies that other than source and destination address, there are no other constraints applied on incoming packets."

::= { mplsFTNRuleEntry 4 }

mplsFTNRuleActionType OBJECT-TYPE

SYNTAX INTEGER {  
    redirectLsp(1), -- redirect into LSP  
    redirectTunnel(2) -- redirect into tunnel  
}

MAX-ACCESS read-create  
STATUS current  
DESCRIPTION  
"The type of action to be taken on packets matching this  
FTN entry."  
::= { mplsFTNRuleEntry 5 }

mplsFTNRuleActionPointer OBJECT-TYPE

SYNTAX RowPointer  
MAX-ACCESS read-create  
STATUS current  
DESCRIPTION

"If mplsFTNRuleActionType is redirectLsp(1), then this  
object MUST contain zeroDotZero or point to a instance  
of mplsXCEntry indicating the LSP to redirect matching  
packets to.

If mplsFTNRuleActionType is redirectTunnel(2), then this  
object MUST contain zeroDotZero or point to a instance  
of mplsTunnelEntry indicating the MPLS TE tunnel to  
redirect matching packets to.

If this object points to a conceptual row instance in a  
table consistent with mplsFTNRuleActionType but this  
instance does not currently exist then no action will  
be taken on packets matching such an FTN entry till  
this instance comes into existence.

If this object contains zeroDotZero then no action will  
be taken on packets matching such an FTN entry till it  
is populated with a valid pointer consistent with the  
value of mplsFTNRuleActionType as explained above."

::= { mplsFTNRuleEntry 6 }

mplsFTNRuleStorageType OBJECT-TYPE

SYNTAX StorageType  
MAX-ACCESS read-create  
STATUS current  
DESCRIPTION

"The storage type for this FTN entry. Conceptual rows  
having the value 'permanent' need not allow write-  
access to any columnar objects in the row."

DEFVAL { nonVolatile }

::= { mplsFTNRuleEntry 7 }

mplsFTNRuleRowStatus OBJECT-TYPE

SYNTAX RowStatus  
MAX-ACCESS read-create

```

STATUS          current
DESCRIPTION
    "Used for controlling the creation and deletion of this
    row. All writeable objects in this row may be modified
    at any time. When creating a row in this table with a
    non-zero value of mplsFTNRulePolicyPointer, a row with
    similar index must be present in mplsFTNRulePolicyTable"
 ::= { mplsFTNRuleEntry 8 }

```

```
-- Next free index in mplsFTNTable.
```

```

mplsFTNRulePolicyIndexNext OBJECT-TYPE
    SYNTAX          MplsFTNRuleEntryIndexOrZero
    MAX-ACCESS      read-only
    STATUS          current
    DESCRIPTION
        "This object contains the next available valid value to
        be used for mplsFTNRulePolicyIndex when creating entries
        in the mplsFTNRulePolicyTable.

        When creating a new conceptual row (configuration
        entry) in mplsFTNRulePolicyTable with an SNMP SET
        operation, the Network Management application must
        first issue a management protocol retrieval operation
        to obtain the current value of this object.

        If the command responder (agent) does not wish to allow
        creation of more entries in mplsFTNTable, possibly
        because of resource exhaustion, this object MUST return
        a value of 0.

        If a non-zero value is returned the Network Management

        Application must determine whether the value is indeed
        still unused since two Network Management Applications
        may attempt to create a row simultaneously and use the
        same value.

        If it is currently unused and the SET succeeds, the
        agent MUST change the value of this object to a
        currently unused non-zero value (according to an
        implementation specific algorithm) or zero (if no
        further row creation will be permitted).

        If the value is in use, however, the SET fails and the
        Network Management Application must then reread this
        object to obtain a new usable value."

```

```

 ::= { mplsFTNRuleObjects 2 }

-- FTN Policy table.

mplsFTNRulePolicyTable OBJECT-TYPE
    SYNTAX          SEQUENCE OF MplsFTNRulePolicyEntry
    MAX-ACCESS      not-accessible
    STATUS          current
    DESCRIPTION
        "Each entry in this table extends the rule defined in
        mplsFTNRuleTable (source and destination address). These
        optional rules are applied on the incoming packets and
        based on the matching an action defined by mplsFTNRuleActionType
        is taken."
    ::= { mplsFTNRuleObjects 3 }

mplsFTNRulePolicyEntry OBJECT-TYPE
    SYNTAX          MplsFTNRulePolicyEntry
    MAX-ACCESS      not-accessible
    STATUS          current
    DESCRIPTION
        "Each entry extends the additional set of optional rules
        to be applied on incoming packets."
    INDEX { mplsFTNRulePolicyIndex }
    ::= { mplsFTNRulePolicyTable 1 }

MplsFTNRulePolicyEntry ::= SEQUENCE {
    mplsFTNRulePolicyIndex      MplsFTNRuleIndex,
    mplsFTNRulePolicyMask       BITS,
    mplsFTNRulePolicySrcAddr     InetAddress,
    mplsFTNRulePolicySrcPfxLen   InetAddressPrefixLength,
    mplsFTNRulePolicySrcPortMin  InetPortNumber,
    mplsFTNRulePolicySrcPortMax  InetPortNumber,
    mplsFTNRulePolicyDestPortMin InetPortNumber,
    mplsFTNRulePolicyDestPortMax InetPortNumber,
    mplsFTNRulePolicyProtocol    Integer32,
    mplsFTNRulePolicyDscp        Dscp,
    mplsFTNRulePolicyStorageType StorageType,
    mplsFTNRulePolicyRowStatus   RowStatus
}

mplsFTNRulePolicyIndex OBJECT-TYPE
    SYNTAX          MplsFTNRuleIndex
    MAX-ACCESS      not-accessible
    STATUS          current
    DESCRIPTION
        "This is the unique index for a conceptual row in

```

```
mplsFTNRulePolicyTable.  
To create a new conceptual row in mplsFTNRulePolicyTable  
a Network Management Application SHOULD retrieve the  
current value of mplsFTNRulePolicyIndexNext to determine  
the next valid available value of mplsFTNRulePolicyIndex."  
::= { mplsFTNRulePolicyEntry 1 }  
  
mplsFTNRulePolicyMask OBJECT-TYPE  
SYNTAX          BITS {  
    sourceAddr(0),  
    sourcePort(1),  
    destPort(2),  
    protocol(3),  
    dscp(4)  
}  
MAX-ACCESS      read-create  
STATUS          current  
DESCRIPTION  
    "This bit map indicates which of the fields described  
    next, source port range, destination port range, IPv4  
    Protocol field or IPv6 next-header field and  
    Differentiated Services Code Point (DSCP) is active for  
    this FTN entry. If a particular bit is set to zero then  
    the corresponding field in the packet MUST be ignored  
    for comparison purposes."  
::= { mplsFTNRulePolicyEntry 2 }  
  
mplsFTNRulePolicySrcAddr OBJECT-TYPE  
SYNTAX          InetAddress  
MAX-ACCESS      not-accessible  
STATUS          current  
DESCRIPTION  
    "The Source IP address. The type of this object is  
    determined by the corresponding mplsFTNRuleAddrType  
    object."  
::= { mplsFTNRulePolicyEntry 3 }  
  
mplsFTNRulePolicySrcPfxLen OBJECT-TYPE  
SYNTAX          InetAddressPrefixLength  
MAX-ACCESS      not-accessible  
STATUS          current  
DESCRIPTION  
    "Indicates the number of leading one bits that form the  
    mask to be logical-ANDed with the source address  
    before being compared to the value in the  
    mplsFTNRulePolicySrcAddr field.  
  
    The values for the index objects mplsFTNRulePolicySrcAddr
```

and mplsFTNRulePolicySrcPfxLen must be consistent. When the value of mplsFTNRulePolicySrcAddr (excluding the zone index, if one is present) is x, then the bitwise logical-AND of x with the value of the mask formed from the corresponding index object mplsFTNRulePolicySrcPfxLen MUST be equal to x. If not, then the index pair is not consistent and an inconsistentName error must be returned on SET or CREATE requests."

::= { mplsFTNRulePolicyEntry 4 }

mplsFTNRulePolicySrcPortMin OBJECT-TYPE

SYNTAX InetPortNumber

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The lower end of the source port range."

DEFVAL { 0 }

::= { mplsFTNRulePolicyEntry 5 }

mplsFTNRulePolicySrcPortMax OBJECT-TYPE

SYNTAX InetPortNumber

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The higher end of the source port range "

DEFVAL { 65535 }

::= { mplsFTNRulePolicyEntry 6 }

mplsFTNRulePolicyDestPortMin OBJECT-TYPE

SYNTAX InetPortNumber

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The lower end of the destination port range."

DEFVAL { 0 }

::= { mplsFTNRulePolicyEntry 7 }

mplsFTNRulePolicyDestPortMax OBJECT-TYPE

SYNTAX InetPortNumber

MAX-ACCESS read-create

STATUS current

DESCRIPTION

"The higher end of the destination port range."

DEFVAL { 65535 }

::= { mplsFTNRulePolicyEntry 8 }

mplsFTNRulePolicyProtocol OBJECT-TYPE

SYNTAX Integer32 (0..255)

```

MAX-ACCESS      read-create
STATUS          current
DESCRIPTION
    "The IP protocol to match against the IPv4 protocol
    number or IPv6 Next-Header number in the packet. A
    value of 255 means match all. Note that the protocol
    number of 255 is reserved by IANA, and Next-Header
    number of 0 is used in IPv6."
DEFVAL { 255 }
::= { mplsFTNRulePolicyEntry 9 }

mplsFTNRulePolicyDscp OBJECT-TYPE
SYNTAX          Dscp
MAX-ACCESS      read-create
STATUS          current
DESCRIPTION
    "The contents of the DSCP field."
REFERENCE
    "Nichols, K., Blake, S., Baker, F. and D. Black,
    Definition of the Differentiated Services Field (DS
    Field) in the IPv4 and IPv6 Headers, RFC 2474, December
    1998."
::= { mplsFTNRulePolicyEntry 10 }

mplsFTNRulePolicyStorageType OBJECT-TYPE
SYNTAX          StorageType
MAX-ACCESS      read-create
STATUS          current
DESCRIPTION
    "The storage type for this FTN Policy. Conceptual rows
    having the value 'permanent' need not allow write-
    access to any columnar objects in the row."
DEFVAL { nonVolatile }
::= { mplsFTNRulePolicyEntry 11 }

mplsFTNRulePolicyRowStatus OBJECT-TYPE
SYNTAX          RowStatus
MAX-ACCESS      read-create
STATUS          current
DESCRIPTION
    "Used for controlling the creation and deletion of this
    row. All writeable objects in this row may be modified
    at any time.
    A row must be created in this table before being
    indexed by mplsFTNRuleTable."
::= { mplsFTNRulePolicyEntry 12 }

END

```

## 9. Security Considerations

This MIB contains readable objects whose values provide information related to FEC to NHLFE mapping. There are also a number of objects that have a MAX-ACCESS clause of read-create, such as those which allow an administrator to dynamically configure LSRs to redirect non-MPLS traffic into an MPLS cloud.

While unauthorized access to the readable objects is relatively innocuous, unauthorized access to the write-able objects could cause traffic being redirected to unintended destinations resulting into denial of service to the end user. Hence, the support for SET operations in a non-secure environment without proper protection can have a negative effect on network operations.

SNMPv1 by itself is such an insecure environment. Even if the network itself is secure (for example by using IPSec [24]), even then, there is no control as to who on the secure network is allowed to access and SET (change/create/delete) the objects in this MIB.

It is recommended that the implementers consider the security features as provided by the SNMPv3 framework. Specifically, the use of the User-based Security Model RFC 2574 [12] and the View-based Access Control Model RFC 2575 [15] is recommended.

Further, deployment of SNMP versions prior to SNMPv3 is NOT RECOMMENDED. Instead, it is RECOMMENDED to deploy SNMPv3 and to enable cryptographic security. It is then a customer/operator responsibility to ensure that the SNMP entity giving access to an instance of this MIB module is properly configured to give access to the objects only to those principals (users) that have legitimate rights to indeed GET or SET (change/create/delete) them.

## 10. IANA Considerations

As described in [MPLSMGMT] and as requested in [RFC3811], MPLS related standards-track MIB modules should be rooted under the mplsStdMIB subtree. New assignments can only be made by a standards action as specified in [RFC2434].

## 11. Contributors

The authors wish to thank Ina Minei for her valuble inputs to this work.

Comments should be made directly to the MPLS mailing list at [mpls@lists.ietf.org](mailto:mpls@lists.ietf.org)

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